

REMARKS

Claims 1, 3 and 5-8 stand rejected under 35 U.S.C. § 102 as being anticipated by Chen et al. '091 ("Chen"), and claims 2, 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over Chen in view of Gopalraja et al. '177 ("Gopalraja"). Claim 1 is the sole independent claim. These rejections are respectfully traversed for the following reasons.

Claim 1 recites in pertinent part, "a third step of subjecting the underlying layer to sputter-etching so that a part of the underlying layer deposited on the bottom surface of the contact hole is at least partially deposited on the lower part of the sidewall surface of the contact hole ... wherein in the third step, a film thickness of the underlying layer deposited on the lower part of the sidewall surface of the contact hole increases while a part of the underlying layer remains on the bottom surface of the contact hole." Support for this feature can be found, for example, on page 4, lines 10-16 of Applicants' specification and Figures 2A,B of Applicants' drawings. In contrast, Chen expressly discloses removal of the bottom portion 32 of the barrier layer 30 (*see* col. 4, lines 62-64 and Figure 3).

Gopalraja, on the other hand, discloses a sputter *deposition* process (by depositing copper ions with high-energy sputtering and by resputtering the copper) rather than a sputter-*etch* process as part of the alleged third step. Indeed, Gopalraja teaches away from using a sputter-etch process (*see, e.g.*, col. 6, lines 35+ of Gopalraja, which expressly teaches away from using a sputter-etch step).

According to one aspect of the present invention, because the underlying layer (or the plating seed layer) can be continuously deposited on the lower part of the sidewall surface of the contact hole, the coverage of the underlying (or the plating seed layer) can be improved so as to enable the prevention of step discontinuity described in Applicants' specification with respect to the

admitted prior art shown in Figures 7-10 of Applicants' drawings. Only Applicants have recognized and considered such a problem, and conceived of a means by which to enable prevention thereof.

As anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed, either expressly or inherently (noting that "inherency may not be established by probabilities or possibilities", *Scaltech Inc. v. Retec/Tetra*, 178 F.3d 1378 (Fed. Cir. 1999)), in a single prior art reference, *Akzo N.V. v. U.S. Int'l Trade Commission*, 808 F.2d 1471 (Fed. Cir. 1986), based on the forgoing, it is submitted that Chen does not anticipate claim 1, nor any claim dependent thereon.

The Examiner is further directed to MPEP § 2143.03 under the section entitled "All Claim Limitations Must Be Taught or Suggested", which sets forth the applicable standard:

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (citing *In re Royka*, 180 USPQ 580 (CCPA 1974)).

In the instant case, the pending rejection does not "establish *prima facie* obviousness of [the] claimed invention" as recited in claim 1 because the cited prior art, alone or in combination, fails the "all the claim limitations" standard required under § 103.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination.

No.: 10/613,048

Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 102/103 be withdrawn.

CONCLUSION

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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